

CLAIMS

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- 5 1. A fastening element for an implant, in particular a hip prosthesis, comprising a supporting element and an at least largely hollow pin extending from the supporting element, while fixing means are provided for fixing the fastening element in a position in which the hollow pin extends at least largely into a bone.
- 10 2. A fastening element according to claim 1, wherein the supporting element is substantially plate-shaped and extends on at least two sides beyond an outer longitudinal edge of the pin.
- 15 3. A fastening element according to claim 1, wherein the pin has a longitudinal axis which includes an angle with a main surface of the supporting element, such that during use the supporting element abuts against a sawn-off surface of a bone and the longitudinal axis of the pin extends at an angle with respect to said surface.
- 20 4. A fastening element according to claim 1, wherein the fixing means comprise at least one wire element which during use extends from a side remote from the supporting element, of the bone or bone system in which the pin is fitted, into or alongside the pin and has been fixed to the pin and/or the supporting element.
- 25 5. A fastening element according to claim 1, wherein the supporting element comprises on the side remote from the pin a coupling element for a further part of a prosthesis or orthosis.
6. A fastening element according to claim 5, wherein the coupling element is offset with respect to the longitudinal axis of the pin.
- 30 7. A fastening element according to claim 1, arranged as a fastening element for a hip prosthesis, the pin comprising a longitudinal axis, the supporting element at least adjacent the

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pin being plate-shaped, and the longitudinal axis including an angle with at least the plate-shaped part of the supporting element which is between 125° and 145°.

8. A fastening element according to claim 1, arranged as a fastening element for a hip prosthesis, the pin comprising a longitudinal axis, the supporting element at least adjacent the pin being plate-shaped, and the longitudinal axis including an angle with at least the plate-shaped part of the supporting element which is smaller than about 125°, for use with a *coxa vara*.
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10. 9. A fastening element according to claim 1, arranged as a fastening element for a hip prosthesis, the pin comprising a longitudinal axis, the supporting element at least adjacent the pin being plate-shaped, and the longitudinal axis including an angle with at least the plate-shaped part of the supporting element which is greater than about 145°, for use with a *coxa valga*.
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10. A fastening element according to claim 1, wherein the pin has at least partly a cross section, at right angles to the longitudinal axis thereof, which is not symmetrical with respect to said longitudinal axis, preferably slightly triangular or multiangular.
- 20 11. A fastening element according to claim 1, wherein the pin is provided, on at least the outside or the inside, preferably on both sides, with a finish which enables, preferably improves, bone ingrowth.
- 25 12. A fastening element according to claim 1, wherein the fixing means are manufactured at least partly from memory metal.
13. A fastening element according to claim 1, wherein the fixing means comprise tensioning means with which a bias can be set.

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14. A fastening element according to claim 1, wherein the fixing means comprise at least one screw which is screwable into the pin and/or the supporting element from the side remote from the supporting element.

5 15. A fastening element according to claim 14, wherein at least two and preferably three or four screws are provided, screwable into the supporting element, at a distance from the pin.

10 16. An assembly of a bone and a fastening element for an orthesis or prosthesis, which fastening element comprises a supporting element and a pin extending from the supporting element and being preferably at least largely hollow, with a portion of the bone having been sawn off, such that an abutment surface has been obtained which is at least partly defined by spongy bone, while the pin has been driven at least partly into the spongy bone, such that the supporting element abuts against said abutment surface, preferably at least partly against 15 cortical bone, with at least the pin having been fixed in the bone.

17. An assembly according to claim 16, wherein fixing means are used which comprise at least one fixing element which, remote from the fastening element, has been inserted through cortical bone of the bone in question and has been coupled to the fastening element, which 20 fixing element has a supporting surface for being supported against said cortical bone.

18. An assembly according to claim 16, wherein the bone is a femur or portion thereof, wherein the femur head has been sawn off, wherein at least a part of the neck has been maintained, such that an abutment surface has been obtained, preferably such that in the 25 normal upright position of the femur the abutment surface extends approximately horizontally, while the longitudinal axis of the pin includes an angle with the supporting element, and the pin has been driven into the spongy bone, such that the supporting element lies flat against the abutment surface.

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19. An assembly according to claim 18, wherein said angle between longitudinal axis and supporting element corresponds approximately to the CCD angle of the femur in question.

5 20. An assembly according to claim 17, wherein a fastening pin has been inserted through the lateral cortical bone and is connected with the pin or the supporting element, while the fastening pin is provided with supporting means which are supported against the lateral cortical bone.

10 21. An assembly according to claim 16, wherein on the supporting element a coupling element is provided for a portion of the prosthesis or orthosis, in particular a hip head, so positioned that it has an offset with respect to the longitudinal axis of the femur.

15 22. An assembly according to claim 21, wherein on the coupling element a hip head has been placed, while the longitudinal axis of the pin intersects the hip head, preferably approximately through the center thereof.

23. An assembly according to claim 21, wherein the coupling element is cone-shaped and has a longitudinal axis which includes an angle with the longitudinal axis of the pin, which corresponds approximately to the CCD angle of the femur in question.

20 24. An assembly according to claim 16, wherein the pin is of hollow design and is provided with a sidewall with openings and/or slots into which and/or through which bone has grown.

25 25. An assembly according to claim 16, wherein at least one bolt has been screwed from the lateral cortex into the supporting element, in particular into the pin.

30 26. An assembly according to claim 16, wherein at least two and preferably three or four bolts have been screwed from the lateral cortex into the supporting element, at a distance from the pin.

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27. A tool for fitting a fastening element according to claim 1 in a bone, in particular in a surface obtained by sawing off a portion of said bone, which surface contains at least a portion defined by spongy bone, which tool comprises a template provided with a hole pattern corresponding to a circumference of a pin of the fastening element, which holes have a centerline which extends parallel to the angle between a supporting element of the fastening element and the longitudinal axis of the pin, such that after placement of the template on said surface, through said holes a series of bores in the bone can be provided, whereafter the pin can be driven into the bone, steered by said bores.

5 10 28. A tool according to claim 27, wherein at least one central opening is provided for drilling a passage for a fastening pin.

15 29. A method for fastening an implant in a bone of a patient, wherein a bone is at least partly sawn off for forming an abutment surface, the abutment surface being provided such that it extends approximately at right angles to the load axis of the joint, at least bone, in question, whereafter at least one pin of a fastening element is driven from the abutment surface into the bone, such that a supporting element to which the pin is fastened comes to lie against said abutment surface.

20 30. A method according to claim 29, wherein the pin is driven into the bone at an angle with respect to said surface.

25 31. A method according to claim 30, wherein as bone a femur is chosen, whose head is subcapitally sawn off, whereafter the pin is driven into the bone at an angle such that the longitudinal axis of the pin extends approximately parallel to the longitudinal axis of the neck, at least prior to removal.

32. A method according to claim 29, wherein in the bone drillings are performed prior to driving the pin into the bone.

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33. A method according to claim 29, wherein the fastening element is fixed from a cortical bone part remote from the abutment surface by introducing at least one pin through said cortical bone, which pin is fixed to the fastening element.